UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Northwest Region
7600 Sand Point Way N.E., Bldg. 1
BIN C15700
Seattle, WA 98115-0070

January 13, 2003

Elizabeth Healy
Federal Highway Administration
Evergreen Plaza Building
711 S. Capitol Way
Olympia Washington 98501

Re: Endangered Species Act Section 7 Consultation and Magnuson-Stevens Fishery Conservation and Management Act Essential Fish Habitat Consultation for Ebey Slough Bridge 529/25 Replacement (WSB-01-400).

Dear Ms. Healy:

The attached document transmits the National Marine Fisheries Service's (National Oceanic and Atmospheric Administration [NOAA] Fisheries) Biological Opinion (Opinion) on the proposed Ebey Slough Bridge 529/25 Replacement project in accordance with section 7 of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq*.). The Federal Highway Administration (FHWA) determined that the proposed actions are likely to adversely affect Puget Sound chinook (*Oncorhynchus tshawytscha*) that occur under NOAA Fisheries' jurisdiction. Formal consultation was initiated for this project on August 7, 2002.

This Opinion reflects formal consultation and an analysis of effects covering the Puget Sound chinook in Marysville, Washington. The Opinion is based on information provided in the Biological Assessment (BA) and other information sent to NOAA Fisheries by the FHWA on September 4, 2002, and additional information transmitted in a letter from Washington State Department of Transportation on July 3, 2002, and via telephone conversations and e-mail. A complete administrative record of this consultation is on file at the Washington Habitat Branch Office.

The NOAA Fisheries concludes that implementation of the proposed projects is not likely to jeopardize the continued existence of Puget Sound chinook. In your review, please note that the incidental take statement, which includes reasonable and prudent measures and terms and conditions, was designed to minimize take.

If you have any questions, please contact Joel Moribe of the Washington Habitat Branch Office at (206) 526-4359.

Sincerely,

for Michael R Crouse

D. Robert Lohn
Regional Administrator

Enclosure

cc: Gary Davis, WSDOT
Paul Wagner, WSDOT

Endangered Species Act - Section 7 Consultation
Biological Opinion
&
Magnuson-Stevens
Fishery Conservation and Management Act
Essential Fish Habitat Consultation

Ebey Slough Bridge 529/25 Replacement
Marysville, Washington
WSB-01-400

Agency: Federal Highway Administration

Consultation Conducted By: National Marine Fisheries Service, Northwest Region

Issued by: for Michael R Course Date: January 13, 2003

D. Robert Lohn
Regional Administrator

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1.0 INTRODUCTION

This document transmits the National Marine Fisheries Service's (National Oceanic and Atmospheric Administration [NOAA] Fisheries) Biological Opinion (Opinion) under Section 7 of the Endangered Species and Essential Fish Habitat (EFH) consultation under the Magnuson-Stevens Fishery Conservation and Management Act, based on our review of a proposal by Federal Highway Administration (FHWA) to fund a project to replace the Ebey Slough 529/25 Bridge (Ebey Slough Bridge) in Snohomish County, Washington. The existing bridge crosses Ebey Slough, one of several waterways in the Snohomish River Delta, in the range of the Puget Sound chinook salmon evolutionary significant unit (ESU). Ebey Slough is in Washington Resources Inventory Area (WRIA) 7. Ebey Slough is also essential fish habitat for chinook (*Oncorhynchus tshawytscha*), coho (*O. kisutch*), Puget Sound pink salmon (*O. gorbuscha*), 18 groundfish species, and 4 coastal pelagic species.

1.1 Background Information

The FHWA concluded that the project proposed by the Washington State Department of Transportation (WSDOT) is likely to adversely affect Puget Sound chinook, but will not adversely affect EFH. The existing bridge is dilapidated and sub-standard for existing traffic and water flow conditions. The proposed replacement will upgrade the bridge to county highway standards to meet structural capacity requirements.

1.2 Consultation History

This document is based on information provided in the Biological Assessment (BA) and the EFH assessment received by NOAA Fisheries on September 5, 2001, (BA dated November 24, 1999, from WSDOT), and the following written correspondence: On July 10, 2002, NOAA Fisheries received information regarding the temporary work bridge, wetland mitigation, and bridge and fill removal from WSDOT. On July 15, 2002, NOAA Fisheries received additional information regarding temporary road access and demolition of the existing bridge. All additional information necessary to complete formal consultation was received by NOAA Fisheries on July 31, 2002.

Through consultation between the agencies, construction techniques have been identified and included in the proposed action that were not originally proposed in the BA. These techniques are discussed in this document and are evaluated in the effects analysis.

1.3 Description of Proposed Action

The FHWA proposes to fund, in whole or in part, a construction project to replace the Ebey Slough Bridge. The Ebey Slough Bridge connects State Route (SR) 529 to State Avenue in the City of Marysville (the City). Traffic volumes on the existing Ebey Slough Bridge prevent the closure of the existing roadway during construction. Therefore, the existing bridge will be demolished following construction of the new bridge.

1.3.1 Construction and Removal of Temporary Work Bridge

Prior to construction of the new bridge, WSDOT will clear 1.2 acres of upland vegetation throughout the project corridor and fill approximately 0.33 acres of estuarine wetland. After clearing the project corridor and placing the fill, WSDOT will construct a temporary access road and bridge.

To keep the existing bridge open to traffic, the City must construct the temporary work bridge and construction access for the existing and new bridges. The temporary access bridge will remain in Ebey Slough for approximately 15-16 months until construction of the permanent replacement bridge is complete, when, the temporary work bridge will be removed completely. The temporary bridge will consist of up to 28 wood or steel pilings driven into the river bed, with a 20-foot wide steel or untreated timber deck placed on the pilings.

1.3.2 Construction of New Bridge

WSDOT will install five concrete columns to support the new bridge. The columns will be installed in the dry, with the use of coffer dams to isolate the concrete work from the river. Five coffer dams will be installed, each enclosing approximately 1,364 square feet of substrate, to create a water tight work space for each column. The bottom of the river bed will be excavated to the desired depth (about 30 feet below the sediment) within the coffer dam. The pier columns will be cast into the pier footing in two sections, the first section includes all portions of the piers under mean higher high water (MHHW). Once those are constructed and cured, the coffer dams will be removed. The second section of each pier (all above MHHW) will then be connected to their corresponding first sections. Pre-cast girders and the bridge deck will then be constructed to complete the bridge. WSDOT will then realign the connecting roads and traffic will be opened to the new bridge.

1.3.3 Demolition of Existing Bridge

The majority of the bridge demolition and removal will be conducted from a derrick on a barge. No blasting will be required for the demolition work. Large sections of the superstructure will be dismantled and removed mechanically. The remaining sections will be broken into large pieces and hauled off site. The existing steel truss, which has lead paint, will be cut into manageable sections. WSDOT will use a combination of saws, jackhammers, and other mechanical methods to break up the concrete and steel into manageable pieces to be hauled away and disposed of in an appropriate disposal facility. To avoid contaminating Ebey Slough, WSDOT will use a containment system placed under the bridge deck to capture debris, and a vacuum system to capture slurry water from the wet-saw.

The bridge piers themselves will be cut at the mud line. Each pier will be removed at least one foot below the substrate and backfilled with clean gravel. Because WSDOT has not committed to use a coffer dam during the pier removal, NOAA Fisheries assumed for this analysis that a coffer dam will not be used and the bridge piers will be cut within the water column.

The final piece of the bridge, the existing wooden bridge rest structure (creosote treated), will be removed in large sections using a clamshell dredge to break sections of the wooden structure off below the mud line. When that work is complete, the Coast Guard is requiring WSDOT to remove approximately 3,000 cubic yards of sediments previously accumulated by the wooden structure, considering them a hazard to navigation once the wooden structure is removed. WSDOT will dredge and dispose of the sediments at an approved disposal site.

1.3.4 Culvert Installation

As part of the project, WSDOT will install in Steamboat Slough a new 18-inch culvert adjacent to an existing culvert which is deteriorating and collapsing. The existing culvert crosses SR-529 approximately 1,200 feet South of the Ebey Slough Bridge. The new culvert installation is intended to pass fish and prevent stranding. The culvert will be constructed when ground water levels are low and off-channel habitat is not accessible to fish.

1.3.5 Construction of Stormwater Facilities

By replacing the bridge and realigning the road, WSDOT will create 1.5 acres of new impervious surface. WSDOT proposes to minimize the effect of creating additional new impervious surface by constructing three bioswales to treat 296% of the new impervious surface for water quality. Water quantity was not considered in the design because the benefit of water quantity treatment discharging to a salt-water environment would be minimal.

1.3.6 Wetland Mitigation

In order to compensate for the 0.33 acres of filled estuarine wetland, WSDOT proposes to contribute financially to the Qwuloolt (Great Marsh) Restoration Project, that is being planned and will be implemented by the Tulalip Tribe, and other government agencies. The Qwuloolt Restoration Project will restore up to 400 acres of estuarine wetland by breaching dikes at two or more locations. WSDOT has delineated a three acre parcel that they will purchase and turned over to the trustees of the Qwuloolt Restoration Project for management.

1.3.7 Phases of Construction

Construction is expected to take a total of 19 months. Although construction will be continuous throughout the year, WSDOT will work in-water only between July 16 and February 14, a period when juvenile chinook salmon are not expected to occur in the action area. During the first season of construction (2003), WSDOT will prepare the site for construction of the realigned road and bridge, construct the temporary work bridge and install the pier footings and columns for the new bridge. During the second season, the superstructure and the rest of the bridge will be placed and the existing bridge will be demolished. The City will remove the temporary bridge shortly after the new bridge is completed. All work outside of the established in-water work window will be above the ordinary high water mark, will not contact Ebey Slough, and will not affect any part of the water column.

1.4 Description of the Action Area

The action area is defined as all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action (50 C.F.R. 402.02). For this project, the action area is defined as the water channel which includes the water, and land (including submerged land) 2.0 miles downstream of the Ebey Slough Bridge, and about 3.5 miles upstream from the bridge site to Steamboat Slough. The action area also includes about 0.5 miles of the water channel downstream and about 100 feet upstream of the culvert installation site, and the entire Qwuloolt Restoration Project area as depicted in WSDOT's June 18, 2002 letter to Fish and Wildlife Service. The action area was primarily determined by the distance in which increased turbidity from construction activities could affect fish. Other factors that may determine the action area, such as noise and hydrostatic pressure changes in the water column, are within the defined action area. The action area also includes the adjacent riparian zone within the construction area and all areas affected by the project including the staging area, catch basins and swales.

Additionally, the road widening is part of a central transportation improvement program throughout the City and Snohomish County. The four lane bridge will match the connecting road widths and lane configurations (excluding center turn lanes) on both sides of the bridge. The addition of lanes continues a widening trend on the SR 529/25, State Avenue corridor. The addition of lanes on the new bridge will benefit economic growth and support expected future development of the area. Based on the areas serviced by the proposed road widening, the road and neighboring properties from the bridge south to Interstate-5 (I-5) and from the bridge north to First Street is included in the terrestrial portion of the action area.

2.0 ENDANGERED SPECIES ACT

2.1 Biological Opinion

The purpose of consultation under the Endangered Species Act is to insure that any action authorized, funded or carried out by a Federal agency is not likely to jeopardize the continued existence of threatened or endangered species, or result in the adverse modification of designated critical habitat. Formal consultation concludes with the issuance of a Opinion under section 7(b)(3) of the Act.

2.1.1 Evaluating The Proposed Action

The standards for determining jeopardy are set forth in Section 7(a)(2) of the ESA as defined in 50 C.F.R. Part 402. The NOAA Fisheries must determine whether the action is likely to jeopardize the listed species. This analysis involves the initial steps of (1) defining the biological requirements of the listed species, and (2) evaluating the relevance of the environmental baseline to the species' current status.

Subsequently, NOAA Fisheries evaluates whether the action is likely to jeopardize the listed species by determining if the species can be expected to survive with an adequate potential for recovery. In making this determination, NOAA Fisheries must consider the estimated level of injury and mortality attributed to: (1) collective effects of the proposed or continuing action, (2) the environmental baseline, and (3) any cumulative effects. This evaluation must take into account measures for survival and recovery specific to the listed salmon's life stages that occur beyond the action area. NOAA Fisheries must identify reasonable and prudent alternatives for the action if it is determined that the action will jeopardize a listed species.

2.1.1.1 Biological Requirements

The biological requirements are those conditions necessary for Puget Sound chinook to survive and recover to naturally reproducing population levels at which time protection under the ESA would become unnecessary. Adequate population levels must safeguard the genetic diversity of the listed stock, enhance their capacity to adapt to various environmental conditions, and allow them to become self-sustaining in the natural environment.

Biological requirements are defined as properly functioning conditions (PFC) of habitat characteristics that are relevant to any chinook life stage. These habitat conditions include all parameters of the matrix of pathways and indicators (MPI) described in NMFS (1996), e.g., adequate water quality, habitat access, flow/hydrology, and riparian reserves. Information related to biological requirements for Puget Sound chinook may be found in Myers et al. (1998). Listed salmonids use the action area as a migratory corridor and possibly for juvenile rearing. The specific biological requirements of Puget Sound chinook that are likely to be affected by the proposed action include water quality and habitat access.

2.1.1.2 Environmental Baseline

The environmental baseline represents the current set of conditions, to which the effects of the proposed action are added. Environmental baseline is defined as "the past and present impacts of all Federal, State, and private actions and other human activities in the action area, the anticipated impacts of all proposed Federal projects in the action area that have already undergone formal or informal section 7 consultation, and the impact of State or private actions which are contemporaneous with the consultation process" (50 C.F.R. 402.02).

The proposed project is located in the Snohomish River watershed in Snohomish County, Washington. The watershed drains a land area of approximately 1,780 square miles with headwaters in the Cascade Mountains. The project area is located at about River Mile (RM) 2.0 on Ebey Slough, part of the Snohomish River delta. The Snohomish River delta extends from about RM 6.1, where Ebey Slough diverges from the main stem Snohomish River, to the mouth. The delta region located between Ebey Slough and the Snohomish River is tidally influenced. Both the floodplain and delta reaches of the Snohomish River have low and relatively consistent gradients. The project area provides a migration corridor and rearing habitat for both major populations of Puget Sound chinook in the Snohomish River.

Similar to chinook habitat throughout the Puget Sound ESU, Ebey Slough and the Snohomish Basin has been significantly altered by human activities for over a century. Conditions of the streams and rivers of the Snohomish River Basin range from pristine to moderately impacted to heavily impacted, reflecting the variety of land uses, including timber production; urban, industrial, and rural residential; and agriculture (Pentec 1999). The present condition of the system is mainly the result of historic diking, dredging, construction of fish passage barriers, roads and utility corridors, industrial discharges, agriculture, log rafting, nonpoint source pollution, channelization of floodplain tributaries, removal of riparian forest, and removal of woody debris.

Riparian conditions have been disturbed along the Snohomish River. The forests that provided woody debris and important food sources to the aquatic system have now been virtually eliminated. In 1861 timber harvest began along Ebey Slough (Haas 2001). In the Snohomish delta where the proposed project is located, about 7 square miles of forested wetland and 11 square miles of emergent wetland existed in 1855 (Bortleson et al. 1980). Although much of the emergent wetlands of the Snohomish delta remain, most of the forested wetlands and nearly all of the major wetlands of the lower basin have been logged and drained. Large woody debris (LWD) is still removed from the system and existing conditions in the action area are not properly functioning for LWD.

Other channel modifications such as harbor construction, dredging, diking and bank armoring combined with a reduction in wetland acreage and riparian vegetation have significantly changed the landscape along the lower part of the river over the past 150 years. Today, 43 miles of dikes in the lower estuary downstream of the divergence of Ebey Slough from the main stem isolate the river from its former tidal marsh (Pentec 1998). Ebey Island is used primarily for pasture land and agriculture today.

The Snohomish River delta and lower Snohomish River is dominated by agricultural land use with some urbanized centers such as the Cities of Marysville and Everett. Management of agricultural and urban lands has degraded salmonid habitat in many areas of the watershed. Practices such as farming to the edge of streams, removing riparian vegetation, filling off-channel areas, diking and channelization, conversion of native perennial vegetation to annual crops, irrigation, increasing stormwater flow into the river, pollutant and fine sediment loading, increased surface water temperature, and exacerbated flooding have all contributed to habitat degradation in the action area.

2.1.1.3 Factors Affecting Species in the Action Area

The action area borders the City on the north side of the bridge. It is a major water crossing that connects the south end of the City with I-5 and SR 529. The action area is moderately urbanized and many habitat indicators are less than properly functioning. Listed salmonids use the action area as a migratory corridor and possibly for juvenile rearing.

The channel within the action area, along with many other parts of the river is characterized by a lack of off-channel habitat, minimal riparian vegetation, and few wetlands. The action area has

been designated under Section 303(d) of the Clean Water Act as an impaired water body because of low levels of dissolved oxygen, high levels fecal coliform, and impaired pH. Reduced riparian cover, irrigation withdrawals, and runoff are likely contributors to water quality degradation within the basin.

Streambank conditions and floodplain connectivity in the action area are degraded by bank armoring, levees, channelization, and other flood control measures. Riparian vegetation within the action area is not properly functioning and has little woody vegetation. Agricultural practices, armored banks, and urban development have reduced riparian buffers. Buffer widths are narrow and vegetation is mostly immature. Since riparian vegetation has been affected throughout the basin, LWD production in the Snohomish River Basin has been severely reduced. Bank armoring has hindered LWD recruitment in the action area. Roads, urban and rural development, and agricultural land uses have altered channel dynamics and hydrology in the basin.

2.1.1.4 Status of Species

Puget Sound chinook salmon were listed as threatened under the Endangered Species Act (ESA) on March 24, 1999 (64 Fed. Reg. 14308). The ESU includes all naturally spawned populations of chinook salmon from rivers and streams flowing into Puget Sound including the Straits of Juan De Fuca from the Elwha River, eastward, including rivers and streams flowing into Hood Canal, South Sound, North Sound and the Strait of Georgia in Washington.

The Puget Sound ESU is a complex of many individual populations of naturally spawning chinook salmon, and 36 hatchery populations (64 Fed. Reg. 14308; March 24, 1999). NOAA Fisheries' Puget Sound Technical Recovery Team (TRT 2001) tentatively identified 21 geographically distinct populations of chinook in Puget Sound, including two in the Snohomish River Basin. The Snohomish River Basin presently supports summer and fall chinook runs and historically supported a spring run. Chinook salmon are found throughout the entire Snohomish mainstem and most of its larger tributaries (e.g., Snoqualmie River, Skykomish River, Pilchuck River).

Overall abundance of chinook salmon in this ESU has declined substantially from historical levels, and many populations are small enough that genetic and demographic risks are likely to be relatively high. Long-term trends in abundance are predominantly downward, and several populations are exhibiting short-term declines. Factors contributing to the downward trend are widespread stream blockages, degraded habitat, with upper tributaries widely affected by poor forestry practices and lower tributaries and mainstem rivers affected by urbanization and agriculture. Hatchery production and releases of chinook salmon in Puget Sound is widespread and more than half of the recent total Puget Sound escapement returned to hatcheries. Spring and summer run populations throughout this ESU are all depressed and are of special concern to NOAA Fisheries (Myers et al. 1998).

According to peak recorded harvest landings in Puget Sound in 1908, the historic run size of the Puget Sound chinook ESU was estimated to be about 670,000 (Bledsoe et al. 1989). Recent

mean escapements totaling 71,000 correspond to a run entering Puget Sound of 160,000 fish based on run reconstruction of escapement and commercial landings within Puget Sound (BE and LGL 1995). While mean escapement numbers still range in the tens of thousands, 11 of the 29 populations within the ESU were determined to be at "critical" risk with fewer than 1,000 fish. Widespread declines and extirpations of spring and summer run chinook populations represent a significant reduction in the life history diversity of this ESU.

2.1.1.5 Status of the Species within the Action Area

The Snohomish River has summer, and fall chinook runs and both represent an ocean-type life history. Therefore, adult or juvenile chinook presence in the action area is somewhat predictable. Listed salmonids use the action area as a migratory corridor and possibly for juvenile rearing. The timing of in-water construction is proposed to avoid peak juvenile rearing in the estuary, which generally occurs between March and mid-July. Depending on spring peak flows and the time needed for juvenile chinook to adapt to marine conditions, peak residence may actually begin a month earlier than March or later than July.

The Snohomish River is heavily influenced by two hatchery stocks, Wallace River and Bridal Veil Creek. Although Puget Sound chinook are threatened under the ESA, harvest continues throughout the ESU. The State of Washington manages harvest of chinook salmon to maximize harvest of hatchery fish and minimize harvest of wild runs. Harvest management in the ESU has been difficult to implement and is continuously evolving. The United States, Canada, and tribal representatives have revised the Pacific Salmon Treaty numerous times since it was first signed and implemented in 1985.

Most recent estimates of annual average escapement in the Snohomish range from 4,500 to 6,500 spawners per year (Winton 2002). In comparison with other river systems in this ESU, these totals are relatively large, although they do not meet escapement goals. Both Snohomish summer and fall chinook stocks have been declining in abundance and are considered depressed (WDFW 1993). While data is limited regarding historic population levels in the Basin, a 1970 study by the Pacific Northwest River Basins Commission stated that from 1956-1965 chinook returns (catch plus escapement) ranged from 5,520 to 72,480 with an average of 30,720 per year.

Both independent populations of chinook salmon migrate through the action area to their natal streams. Like most of the lowland Snohomish basin, the river banks in the action area are diked. As a result, the action area provides poor rearing habitat. However, adult chinook and some juvenile chinook may rear or hold in pools or other small areas where some habitat diversity exists.

Presently, the biological requirements of listed species are not being met under the environmental baseline. The factors for decline that contributed to the need for listing Puget Sound chinook continue to be present in the action area. To improve the status of the listed species, significant improvements in the habitat conditions are needed. Pentec (1999) lists improving floodplain habitat, restoring saltmarsh habitat and distributary channels in the estuary, and eliminating barriers to fish passage, and riparian restoration as items that could enhance

salmonid production in the basin.

2.1.2 Effects of the Proposed Action

The ESA implementing regulations define "effects of the action" as "the direct and indirect effects of an action on the species together with the effects of other activities that are interrelated or interdependent with that action, that will be added to the environmental baseline." 50 C.F.R. 402.02.

2.1.2.1. Direct Effects

Direct effects are the immediate effects of the project on the species or its habitat. Direct effects result from the agency action and include the effects of interrelated actions and interdependent actions. Future Federal actions that are not a direct effect of the action under consideration (and not included in the environmental baseline or treated as indirect effects) are not evaluated. (50 C.F.R. 402.02)

Generally, the direct effects of this project will result from the extent and duration of construction activities in or adjacent to the Ebey Slough. Juvenile chinook might be present in low numbers in the action area during the proposed construction. To minimize the effects of construction on juvenile chinook, WSDOT will restrict the timing of construction. No in-water work will occur between February 15 and July 15. Adult chinook are also expected to be present during construction, especially during peak fall run upstream migration in late September through October. Adult fish are expected to be less affected by construction activities than juveniles, because of their size, mature development of organs, and their ability to avoid affected areas.

1. Water Quality

Water quality in Ebey Slough will be affected by increased sediment during the installation of temporary piles, installation and removal of coffer dams associated with new pier construction, existing pier removal, retaining wall removal, bridge rest structure removal, and dredging. Water quality may be similarly affected by upland cutting and filling, and vegetation removal. WSDOT intends to use silt fences, hay bales, and other best management practices to avoid or minimize sediment contribution to Ebey Slough from upland construction activities.

WSDOT proposes to drive piles for the temporary structure, and remove the old pier structures, without assuring the use of curtains, booms, or other best management practices. Because placement of cofferdams has more potential to create turbidity than pile driving, this best management practice for in-water disturbance is not appropriate for that portion of the project. Increased turbidity in the action area is therefore reasonably certain to occur during both pile driving and removal of the old piers. WSDOT will minimize the effects of turbidity increases to the species by restricting in-water construction to avoid peak juvenile chinook migration and rearing, as described above.

While numerous studies demonstrate increased turbidity and suspended sediment levels adversely affect juvenile salmonids, little information exists about its effects to adult salmonids. Adult coho exposed to high turbidity (1,400-1,600 mg/L) demonstrated reduced survival (Stober et al. 1981). However, Sumner and Smith (1940), Whitman et al. (1982), and Brannon et al. (1981) demonstrated that adult chinook will avoid water with increased turbidity. Therefore NOAA Fisheries assumes that adult salmonids are more capable of avoiding and surviving turbidity plumes and increased suspended sediments than juveniles.

Accordingly, while adult chinook will be in the action area during expected increases in turbidity and suspended sediments, there are several reasons NOAA Fisheries expects their exposure to be limited: 1) increased turbidity might cause adult chinook to delay their migration or avoid the area during turbid conditions; 2) because the aquatic habitat in Ebey Slough is not properly functioning and provides poor salmonid habitat, it is likely that most of the adult chinook will migrate through the action area quickly, limiting the duration of exposure to turbid conditions; 3) Ebey Slough is only one of several waterways that provide access to spawning grounds upstream. It is likely that the adult chinook migrating through Ebey Slough represents only a portion of the adults returning to their natal streams.

Increased turbidity can also adversely affect invertebrate populations and other food items for rearing juvenile chinook in freshwater systems (Kirn et al. 1986 as cited in Sigler 1990, Emmett et al. 1984 as cited in Sigler 1990, Newcombe and MacDonald 1991). Information regarding increased turbidity and invertebrate populations in the estuarine environment is limited. If eelgrass or seagrass communities, or other habitats with a high abundance of invertebrates are affected, invertebrate populations might be similarly affected. However, there are no eelgrass or large seagrass communities in the action area, and other habitat features that support invertebrate populations, such as overhanging vegetation and LWD do not exist in the action area. Because increased turbidity is expected to be short term, and any affected invertebrate communities in Ebey Slough are expected to recover quickly, a long term reduction in invertebrate abundance or diversity is not expected.

The sediments in the action area are contaminated with metals and organic compounds, but the sediments in Ebey Slough are compacted, reducing the potential volume of sediment that would leave the project site. Sediment disturbance can release contaminants into the action area, exposing chinook that are migrating through the action area. There is a high risk of such contamination of chinook during pier removal, bridge rest structure removal and dredging, installation and removal of temporary piles, installation and removal of coffer dams, and construction of in-water piers. Salmonids exposed to heavy metals can be adversely affected by slowed growth (Jones et al. 2001), poor migration and poor survival in seawater (Lorz et al. 1978), poor reproduction, osmoregulatory stress, and altered structure and function of various organs, including liver (Soengas et al. 1996).

WSDOT will minimize extent of such negative effects by restricting construction timing to limit salmonid exposure, especially juvenile chinook, and by using erosion control measures for some work to limit suspension of contaminated sediments, as identified in the BA and other documents. Additionally, because adult chinook will avoid portions of the action area with high

turbidity and sediment levels, or seek refugia, they will also avoid the contaminants. Finally, since adult fish are not likely to be holding for long periods of time in the action area, they are not expected to accumulate contaminants.

Temporary increases in turbidity and sediment are not expected to influence the environmental baseline over the long term, and the direct effects to Puget Sound chinook associated with exposure to contaminants should be insignificant.

2. Disturbance of Substrate

Excavation, removal of the existing bridge, placement and removal of casings, and the placement and removal of temporary bridge, and dredging will disturb the substrate of Ebey Slough. The substrate in the action area is primarily silts, silty sands, and organic matter. Ebey Slough has been dredged and is mainly devoid of rocks or boulders. Occasionally, wood and other debris may be embedded in the slough within the action area that may provide holding or rearing habitat. It is unlikely that modifying the substrate work will affect spawning or rearing habitat, although instream work might degrade fish habitat quality by homogenizing the substrate and reducing the diversity of benthic habitat if wood is removed from the water channel. To minimize the disturbance of substrate, the contractor will stay within the defined work area and designated access routes. Dredging for the placement of new footings and piers will be contained within a coffer dam.

3. Impact Pile Driving

Pile driving will emit a sharp spike in sound, vibration/concussion to water column or ground, and a disturbance to the ground where the pile drives into the sediment causing increased turbidity. The increased turbidity from the pile driving activity is far less likely to directly affect salmonids than the noise or vibration caused by the pile driving itself. Pile driving in Ebey Slough will be limited to between July 16 through February 14 to avoid fish kills during juvenile spring chinook outmigration. Because WSDOT will construct the temporary bridge while adult chinook are migrating, adult chinook are likely to be present in the action area during construction and take is reasonably certain to occur.

Studies have shown that pile driving has noticeable effects on salmonids. Feist et al. (1992) found sound pressure levels (SPL) measured at 600 meters from the point of impact were within the hearing range reported for Atlantic salmon. However, the study did not specify at what distances salmonids reacted negatively to the sounds. The effects are more intense closer to the source and the assumption is that fish are affected more at closer distances. Feist et al. (1992) concluded that salmonids demonstrate avoidance behavior, because twice as many salmonids were observed in the study area on non-pile driving days compared to days with pile driving. However, Carlson, et al (2002) suggest that due to the characteristics of the sounds produced by pile driving, avoidance responses by fishes are not expected. This lack of avoidance results in prolonged exposure to potentially harmful sound, as has been demonstrated for Atlantic salmon (Sonalysts Inc. 1997). The extreme sound pressure levels produced during pile driving activity has been shown to kill several species of fishes. Washington State Ferries recently observed fish

kills during impact pile driving activities in the nearshore marine environment (Visconty, unpublished field notes 2001, Stadler personal observation 2002). Autopsies of dead juvenile striped surfperch (*Embiotoca lateralis*) revealed that swim bladders were ruptured (Visconty, pers. comm.; Stadler personal observation 2002). California Department of Transportation (Caltrans) reported a fish kill caused by impact pile driving during the Benicia Bridge project in San Francisco Bay (Holstege 2002). Holstege (2002) also cited a pile driving study in which dead anchovies, herrings, sardines and various perch, most within 100 feet of the construction barge, but some as far as 500 feet away were documented.

The swimbladder, the gas-filled organ that permits most pelagic fish to maintain neutral buoyancy, is vulnerable to abrupt spikes in pressure. The kidney, liver, spleen, and sinus venous also may rupture and hemorrhage. Damage to the auditory system of fishes can occur at sound levels that are lower than those associated with more serious harm, such as incapacitation or rupture of the swimbladder (Sonalysts, Inc 1997). Popper and Clark (1976) demonstrated that sound pressure levels as low as 149 decibels (dB) (re: 1 µPa) (All dB measurements throughout this document refer to 1 µPa) are sufficient to produce a temporary threshold shift in the hearing sensitivity of the goldfish (*Carassius auratus*). The degree of damage is related to type, size and pattern of the disturbance, distance from the point of disruption, water depth, and species, size and life stage of fish. Carlson (1997) recorded measurements during impact pile driving on wooden piles ranging from 160.8 dB (0.11 kPa) and 195.5 dB (6 kPa). Feist et al. (1992) reported observations based on pressure measurements in similar ranges from hollow concrete piles. Measurements from impact pile driving on steel piles during the Riverside Bridge Project in the Skagit River ranged from 191.1 to 212.4 dB (3.6 to 41.5 kPa) (Widener 2002). The Benicia Bridge project generated a pressure change of over 200 kPa which resulted in instantaneous death to fish in the area. NOAA Fisheries (2001) considered measurements of 150 dB (0.03 kPa) the level of take (adverse affect) (at a distance of 10 meters at a depth of 3 meters), 180 dB (1 kPa) physical harm, and 204 dB (over 10 kPa) instantaneous death.

Although adult chinook are larger and are likely to tolerate pressure changes better than juvenile chinook, pile driving is expected to harm some migrating adult chinook. However, because the size of the hammer used in this proposed action will be much smaller than what was used in the Benicia Bridge project, sediments in Ebey Slough are silty, not rocky, as was the case in the Benicia Bridge project (WSDOT 2002), and the action area is a confined river channel where much of the pressure shock will be absorbed by the surrounding geological features and structures, widespread fish kills like those reported in the Benicia Bridge project are not expected during this proposed action.

4. Wetland Impacts

In order to support the new bridge, WSDOT proposes to fill approximately 0.33 acres of estuarine wetland. The wetland is part of a jurisdictional drainage ditch between SR 529 and private land. Additionally, the proposed five bridge pier design will require filling about 435 square feet within the MHHW mark in Ebey Slough. WSDOT proposes to minimize the effects of wetland impacts by contributing to the Qwuloolt (Great Marsh) Restoration Project. WSDOT will purchase property to expedite the breaching of dikes and reconnection of estuarine and salt marsh habitat. Estuarine wetlands serve as habitat, especially for juvenile chinook who use the areas for rearing during smoltification, and osmoregulation. Additional wetland values to salmonids are refuge during high water, attenuation of velocities during floods, and food source contribution. WSDOT's contribution is expected to make at least three acres of additional estuarine habitat available to chinook salmon, providing an improvement for species over baseline conditions.

5. Vegetation Clearing and Replanting

WSDOT will clear approximately 1.20 acres of upland vegetation throughout the project corridor. Up to 70 trees and numerous saplings will be removed mechanically. To minimize the effects of removing the 1.2 acres of upland vegetation, WSDOT will plant 2.5 acres of native trees and shrubs along the corridor. The replanted vegetation is expected to replace the functions provided by the vegetation that WSDOT proposes to remove. The anticipated adverse effects of vegetation clearing are the movement of upland soils into the water during rain events, and loss of temperature stabilization. These effects are expected to be short term in nature and not expected to influence the environmental baseline in the long term.

2.1.2.2 Indirect Effects

Indirect effects are caused by or result from the proposed action, are later in time, and are reasonably certain to occur. Indirect effects may occur outside of the area directly affected by the action. Indirect effects may include other Federal actions that have not undergone section 7 consultation but will result from the action under consideration. These actions must be reasonably certain to occur, or be a logical extension of the proposed action. (50 C.F.R. 402.02)

1. Impervious Surface and Stormwater Facilities

New or expanded roads add impervious surface to a watershed, potentially causing a variety of problems for fish if not properly addressed. As more impervious surface is added to the watershed, changes in water quality and hydrology that affect salmonid species, are more easily detected. However the effects of added impervious surface in a watershed can be addressed in a variety of ways, including the treatment of stormwater delivered across the impervious area. Stormwater treatment facilities and other techniques can reduce those changes in water quality and quantity if they are designed with the project.

WSDOT proposes to add 1.5 acres of impervious surface in the Snohomish River Basin. The

effects of the additional impervious surface will be minimized by the stormwater treatment facilities designed for this project. The proposed stormwater treatment facilities will treat 4.43 acres for water quality. Water quality treatment will remove pollutants and fine sediments from surface water. Water quantity treatment is not designed for this project but the added impervious surface will not appreciably change the hydrology of the action area. The majority of the impervious surface added in this project is accounted for on the bridge, where precipitation would naturally fall directly into the water channel. The action area is a receiving salt water body and increased peak flow will be immeasurable.

2. Changes in Fluvial Transport

The new bridge will have five piers within the MHHW of Ebey Slough. The new bridge will replace an existing structure that has 24 minor piers, two large piers, and a large wood bridge rest structure. The existing bridge structure including the retaining walls will be completely removed. The new retaining wall will be set back further from Ebey Slough. The new bridge design can contribute to the recovery of channel morphology and will improve floodplain connectivity. Flows through the project corridor will be substantially improved.

WSDOT's installation of the additional culvert on Steamboat Slough will improve fluvial transport of sediments important to diverse habitat. The addition of the culvert will also reduce the probability of catastrophic damage to aquatic habitats that is often associated with undersized culverts during extreme natural events, such as floods. However, adding a culvert next to an existing culvert will not improve passage or recruitment of debris downstream, and if the existing culvert fails, debris could collect behind the culverts, clogging and impeding passage of both debris and fish.

The wetland mitigation proposed for the project is expected to improve channel morphology and floodplain connectivity. The Qwuloolt Restoration Project will connect presently isolated marshland habitat to Ebey Slough when the existing dikes are breached.

3. Land Use Development

Land use activities, especially new development is associable with improvements in local infrastructure. Improved transportation access and level of service can improve the value of land for commercial, industrial, and residential uses. The construction of buildings, parking lots, streets, and driveways change the way in which surface water moves over land and into waters used by listed fish for vary life history requirements. As such, NOAA Fisheries has assumed that infrastructure improvement projects are likely to indirectly effect listed salmonids.

Generally, the land use responses to infrastructure improvements occuring under actions with a Federal nexus, are regulated by local governments such as cities and counties. Therefore, the construction of facilities that might indirectly effect listed salmonids are not within the discretionary action that is the subject of interagency consultation under ESA section 7(a)(2). Nor are those effects covered by the authorization in the Incidental Take Statement prepared under ESA section 7(b)(4).

For the proposed action, the widening of the bridge will improve level of service in the action area. Adjacent rural or low density areas might eventually convert to urban/high density through development. Such development was likely to occur before the proposed action. Nevertheless, the proposed action might influence the rate of development by improving the ease of access. New construction in the action area will affect changes in water quality and hydrology which in turn affect listed salmonids with possible adverse effects on salmonid habitat.

2.1.3 Cumulative Effects

Cumulative effects are defined as "those effects of future state or private activities, not involving Federal activities, that are reasonably certain to occur within the action area of the Federal action subject to consultation" (50 C.F.R. 402.02). Future Federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the ESA

The action area for this project borders the City (population 26,770) and connects to a major north-south corridor that connects the City of Everett (population 95,990) and the City of Arlington (population 12,770) (WOFM 2001). Consistent with the general region, the action area is rapidly developing into high density urban centers.

The increasing urbanization of the Snohomish River watershed threatens the biological health of streams (Jones and Clark 1987; Pedersen and Perkins 1986; Karr 1991; Klein 1979; Booth et al. 2001). Paving of open space increases the amount of impervious surface which shifts surface and subsurface hydrologic patterns. As infiltration is increasingly obstructed by rooftops, roads, parking lots, and driveways, groundwater and aquifer recharge declines, base flows reduce, peak flows from surface water increase, and wetlands dewater. In addition, increased impervious surface precludes the growth of mature trees that would otherwise improves hydrologic patterns by intercepting precipitation and providing duff for water storage, support invertebrate communities for fish food, and provides shade for reducing the temperature of surface flows. The pattern conversion of open space to developed land is expected to continue.

2.1.4 Conclusion

The baseline condition contributes to the depressed status of listed Puget Sound chinook, and cumulative effects are expected to maintain existing conditions or cause additional degradation over time. NOAA Fisheries concludes, however, that the effect of the proposed action, when taken together with effects of the baseline condition and cumulative effects, is not likely to jeopardize the continued existence of Puget Sound chinook. The determination of no jeopardy is based on the following: 1) negative impacts to fish and their habitat from construction will be minimized by timing restrictions for in-water construction and by use of coffer dams and other Best Management Practices, 2) the proposed bridge improves fish habitat over the current conditions, 3) the new culvert improves fish passage over current conditions, 4) the installation of stormwater facilities will provide more the water quality treatment than exists under current conditions, and 5) the wetland mitigation will result in a net increase in the amount of estuarine wetland habitat available. Overall, the proposed activities are not expected to appreciably reduce

the likelihood of survival and recovery of Puget Sound chinook.

2.1.5 Reinitiation of Consultation

Consultation must be reinitiated if the amount or extent of taking specified in the Incidental Take Statement is exceeded, or is expected to be exceeded; new information reveals effects of the action may affect listed species in a way not previously considered; the action is modified in a way that causes an effect on listed species that was not previously considered; or, a new species is listed or critical habitat is designated that may be affected by the action (50 C.F.R. 402.16).

2.2 Incidental Take Statement

Section 9 of the ESA and Federal regulation pursuant to section 4 (d) of the Act prohibit the take of endangered and threatened species without special exemption. "Take" is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct. Harm is further defined as significant habitat modification or degradation that actually kills or injures listed species by "significantly impairing essential behavioral patterns such as breeding, spawning, rearing, migrating, feeding, and sheltering" (50 C.F.R. 222.102). Incidental take is take of listed animal species that results from, but is not the purpose of, the Federal agency or the applicant carrying out an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to, and not intended as part of, the agency action is not considered prohibited taking provided that such takings is in compliance with the terms and conditions of this incidental take statement.

An incidental take statement specifies the effects of any incidental take of endangered or threatened species that is reasonably certain to occur as a result of the proposed action. It also provides reasonable and prudent measures that are necessary to minimize take and sets forth terms and conditions with which the action agency must comply to implement the reasonable and prudent measures.

2.2.1 Amount or Extent of Take Anticipated

Listed Puget Sound chinook use the action area as a migratory corridor and possibly for juvenile rearing. Chinook are expected to be present in the action area during construction of the proposed project, thus the proposed action is reasonably certain to result in incidental take through harm (habitat modification). The proposed action includes measures to reduce the likelihood of incidental take. For any residual take, the following reasonable and prudent measures and terms and conditions are required to minimize the take.

Despite the use of the best scientific and commercial data available, NOAA Fisheries cannot estimate the number of fish that would be injured or killed during construction activities. However, the spatial and temporal extent of these environmental changes provide a habitat surrogate for estimating the amount of take. As such, these estimates represent the limits on incidental take that will be authorized through this Incidental Take Statement. Therefore, should any one of these limits be exceeded during the construction of the project, work must stop and

the action agency must reinitiate consultation.

For water quality effects (increased turbidity), take can occur only within two miles downstream from the point of construction. Should increased turbidity from project construction be observed beyond this extent, work must stop and the action agency must contact NOAA Fisheries.

For effects on substrate, take can only occur within the footprint of the cofferdams used for to isolate the work area from the river. Should the contractor need to revise construction applications for this work, the action agency or its representative must consult with NOAA Fisheries to determine if the extent of effects is increased.

For modification of riparian habitat, take that could result from the removal of 1.2 acres of vegetation, including up to 70 trees is authorized. Should more vegetation need to be removed, the action agency should contact NOAA Fisheries. The effects of this take should be more than offset by the proposal by the action agency to replant 2.5 acres of habitat with native trees and shrubs. However, should the replanting fail, NOAA Fisheries should be contacted.

For modification of existing wetlands, take that could result from the fill of 0.33 acres is authorized. The action agency proposes to more than offset this habitat modification by contributing to projects that would create access to at least 3.0 acres of estuarine wetland. Should the action agency or its representative need to fill more than .33 acres, or should the wetland access project fail, the action agency must contact NOAA Fisheries.

Finally, should acoustic monitoring reveal levels exceeding 150 decibels at three meters depth and 10 meters from the pile and should any dead or injured fish be observed during during pile driving, work must stop and NOAA Fisheries must be contacted. Furthermore, should any inwater activity need to occur outside of the approved work window (July 16 to February 14), work must stop and the action agency must contact NOAA Fisheries.

2.2.2 Reasonable and Prudent Measures

The NOAA Fisheries believes that the following reasonable and prudent measures (RPMs) are necessary and appropriate to minimize incidental take of Puget Sound chinook:

1. The FHWA shall minimize take associated with pile driving.

2. The FHWA shall minimize take associated with increased turbidity and suspension of contaminated sediments into the water column.

3. The FHWA shall minimize take associated with construction by having a fisheries biologist conduct a survey to verify that large numbers of juvenile chinook are not present in the construction area.

2.2.3 Terms and Conditions

To comply with ESA section 7 and be exempt from the prohibitions of ESA section 9, the FHWA must comply with the terms and conditions that implement the reasonable and prudent measures. There terms and conditions are non-discretionary.

1. To implement RPM No. 1 above, the FHWA shall ensure that a fisheries biologist is present at the construction site if impact pile driving is used to install piles. The fisheries biologist shall monitor peak pressure changes in the water column during pile driving. The hydro acoustic monitoring shall consist of:

- Underwater sound levels monitored at three meters depth and 10 meter distance from the pile driving site. If hydroacoustic monitoring from the first five piles do not indicate sound levels exceeding 150 dB at three meters depth and 10 meters distance from the pile, no additional hydroacoustic monitoring is needed as pile driving continues. The energy to drive the first five piles shall be representative of the maximum energy used on the subsequent piles. If levels exceed 150 dB 50% of the time or less but does not exceed 180 dB during the first five piles, pile driving may continue along with continued hydroacoustic monitoring or, at WSDOT's option, pile driving may continue without hydroacoustic monitoring with the use of an appropriate sound attenuation minimization measure as discussed below. If levels exceeded 150 dB more than 50% of the time or exceeded 180 dB during the first five piles, pile driving may only continue with the use of an appropriate sound attenuation minimization measure as discussed below. FHWA shall notify NOAA Fisheries of the hydroacoustic monitoring from the first five piles within 72 hours.

- Based on the outcome of the above described hydroacoustic monitoring, an appropriate sound attenuation minimization measure, such as one of the following, shall be employed. Methods to minimize the underwater sound pressure level may include reducing the force of each strike, or attenuating the underwater sound by enclosing the pile in an air bubble curtain or pile sleeve.

- A report shall be submitted to NOAA Fisheries within 30 days of completion of the project that presents the results of the hydroacoustic monitoring conducted during the project. The following data shall be provided in the report: size and type of pile; approximate energy supplied to the pile; frequency and amplitude of the underwater sound; angle of the pile; water depth, distance from shore or bulkhead; and type and depth of substrate.

Those provisions are incorporated hereby reference as a Term and Condition of this Incidental Take Statement.

2(a). To implement RPM No. 2 above, the FHWA will ensure that removal of the bridge piers, removal of bridge rest structure, and dredging are within a coffer dam. Coffer dams will remain in place until removal and all dredging is complete, and sediments in the water column within the dammed area settle. Those provisions are incorporated here by reference, as a Term and Condition of this Incidental Take Statement.

2(b). To implement RPM No. 2 above, the FHWA will ensure that all dredging and ground

disturbance at the culvert placement site is conducted in a dewatered or isolated work area to prevent sediments from entering the water column. Coffer dams or barriers used to isolate the work area shall remain in place until sediments settle. Those provisions are incorporated here by reference, as a Term and Condition of this Incidental Take Statement.

3. To implement RPM No. 3 above, the FHWA will ensure that a fisheries biologist conducts the survey from the banks of Ebey Slough immediately prior to construction, and if the survey indicates that juvenile chinook are present in large numbers, that construction is delayed until the juveniles have migrated out of the construction area.

3.0 MAGNUSON-STEVENS FISHERY CONSERVATION AND MANAGEMENT ACT

3.1 Background

The Magnuson-Stevens Fishery Conservation and Management Act (MSA), as amended by the Sustainable Fisheries Act of 1996 (Public Law 104-267), established procedures designed to identify, conserve, and enhance EFH for those species regulated under a Federal fisheries management plan. Pursuant to the MSA:

- Federal agencies must consult with NOAA Fisheries on all actions, or proposed actions, authorized, funded, or undertaken by the agency, that may adversely affect EFH (§305(b)(2));
- NOAA Fisheries must provide conservation recommendations for any Federal or State activity that may adversely affect EFH (§305(b)(4)(A));
- Federal agencies must provide a detailed response in writing to NOAA Fisheries within 30 days after receiving EFH conservation recommendations. The response must include a description of measures proposed by the agency for avoiding, mitigating, or offsetting the impact of the activity on EFH. In the case of a response that is inconsistent with the conservation recommendations of NOAA Fisheries, the Federal agency shall must explain its reasons for not following the recommendations (§305(b)(4)(B)).

EFH means those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity (MSA §3). For the purpose of interpreting this definition of EFH: Waters include aquatic areas and their associated physical, chemical, and biological properties that are used by fish and may include aquatic areas historically used by fish where appropriate; substrate includes sediment, hard bottom, structures underlying the waters, and associated biological communities; necessary means the habitat required to support a sustainable fishery and the managed species' contribution to a healthy ecosystem; and "spawning, breeding, feeding, or growth to maturity" covers a species' full life cycle (50 C.F.R. 600.110). Adverse effect means any impact which reduces quality and/or quantity of EFH, and may include direct (*e.g.*, contamination or physical disruption), indirect (*e.g.*, loss of prey or reduction in species fecundity), site-specific or habitat-wide impacts, including individual, cumulative, or synergistic consequences of actions (50 C.F.R. 600.810).

EFH consultation with NOAA Fisheries is required regarding any Federal agency action that may adversely affect EFH, including actions that occur outside EFH, such as certain upstream and upslope activities.

The objectives of this EFH consultation are to determine whether the proposed action would adversely affect designated EFH and to recommend conservation measures to avoid, minimize, or otherwise offset potential adverse effects to EFH.

3.2 Identification of EFH

Pursuant to the MSA the Pacific Fisheries Management Council (PFMC) has designated EFH for federally-managed fisheries within the waters of Washington, Oregon, and California. Designated EFH for groundfish and coastal pelagic species encompasses all waters from the mean high water line, and upriver extent of saltwater intrusion in river mouths, along the coasts of Washington, Oregon and California, seaward to the boundary of the U.S. exclusive economic zone (370.4 km)(PFMC 1998a, 1998b). Freshwater EFH for Pacific salmon includes all those streams, lakes, ponds, wetlands, and other water bodies currently, or historically accessible to salmon in Washington, Oregon, Idaho, and California, except areas upstream of certain impassable man-made barriers (as identified by the PFMC 1999), and longstanding, naturally-impassable barriers (i.e., natural waterfalls in existence for several hundred years)(PFMC 1999). In estuarine and marine areas, designated salmon EFH extends from the nearshore and tidal submerged environments within state territorial waters out to the full extent of the exclusive economic zone (370.4 km) offshore of Washington, Oregon, and California north of Point Conception to the Canadian border (PFMC 1999).

Detailed descriptions and identifications of EFH are contained in the fishery management plans for groundfish (PFMC 1998a), coastal pelagic species (PFMC 1998b), and Pacific salmon (PFMC 1999). Casillas et al. (1998) provides additional detail on the groundfish EFH habitat complexes. Assessment of the potential adverse effects to these species' EFH from the proposed action is based, in part, on these descriptions and information provided by the FHWA.

3.3 Proposed Actions

The proposed action and action area are detailed above in Section 1.4 of this document. The action area includes habitats that have been designated as EFH for various life-history stages of 18 species of groundfish, four coastal pelagic species, and three species of Pacific salmon (Table 1).

3.4 Effects of Proposed Actions

As described in detail in Section 2.1.3 of this document, the proposed action may result in detrimental short- and long-term impacts to a variety of habitat parameters. These adverse effects are:

1. Short term degradation of habitat due to sharp increases in noise and hydrostatic pressure by

impact pile driving of steel piles in the river.

2. Short term degradation of habitat due to increased turbidity in the action area by in-water construction activities.

3. Short term degradation of migration habitat due to the placement of the temporary work bridge into the river.

3.5 Conclusion

NOAA Fisheries believes that the proposed actions may adversely affect EFH for 18 species of groundfish, four coastal pelagic species, and three species of Pacific salmon.

3.6 EFH Conservation Recommendations

Pursuant to Section 305(b)(4)(A) of the MSA, NOAA Fisheries is required to provide EFH conservation recommendations to Federal agencies regarding actions that would adversely affect EFH. While NOAA Fisheries understands that the Federal Highway Administration intends to implement the proposed activity with the built-in conservation measures described in the BA, it does not believe that these measures are sufficient to address the adverse impacts to EFH described above. However, the Terms and Conditions outlined in Section 2.2.3 are generally applicable to designated EFH for chinook, coho, and Puget Sound pink, and address these adverse effects. Consequently, NOAA Fisheries recommends that they be adopted as EFH conservation recommendations.

3.7 Statutory Response Requirement

Pursuant to the MSA (§305(b)(4)(B)) and 50 C.F.R. 600.920(j), Federal agencies are required to provide a detailed written response to NOAA Fisheries' EFH conservation recommendations within 30 days of receipt of these recommendations. The response must include a description of measures proposed to avoid, mitigate, or offset the adverse impacts of the activity on EFH. In the case of a response that is inconsistent with the EFH conservation recommendations, the response must explain the reasons for not following the recommendations, including the scientific justification for any disagreements over the anticipated effects of the proposed action and the measures needed to avoid, minimize, mitigate, or offset such effects.

3.8 Supplemental Consultation

The FHWA must reinitiate EFH consultation with NOAA Fisheries if the proposed action is substantially revised in a manner that may adversely affect EFH, or if new information becomes available that affects the basis for NOAA Fisheries' EFH conservation recommendations (50 C.F.R. 600.920(k)).

TABLE 1: Fish species with designated EFH in the estuarine waters of Puget Sound

Groundfish Species	quillback rockfish *S. maliger*	Coastal Pelagic Species
spiny dogfish *Squalus acanthias*	cabezon *Scorpaenichthys marmoratus*	anchovy *Engraulis mordax*
California skate *Raja inornata*	lingcod *Ophiodon elongatus*	Pacific sardine *Sardinops sagax*
ratfish *Hydrolagus colliei*	kelp greenling *Hexagrammos decagrammus*	Pacific mackerel *Scomber japonicus*
Pacific cod *Gadus macrocephalus*	sablefish *Anoplopoma fimbria*	market squid Loligo opalescens
Pacific whiting (hake) *Merluccius productus*	Pacific sanddab *Citharichthys sordidus*	
black rockfish *Sebastes melanops*	English sole *Parophrys vetulus*	Pacific Salmon Species
bocaccio *S. paucispinis*	rex sole *Glyptocephalus zachirus*	chinook salmon *Oncorhychus tshawytscha*
brown rockfish *S. auriculatus*	rock sole *Lepidopsetta bilineata*	coho salmon *O. kisutch*
copper rockfish *S. caurinus*	starry flounder *Platichthys stellatus*	Puget Sound pink salmon *O. gorbuscha*

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